National Institute of Environmental Health Sciences

Regional variability in relationships between climate and dengue/DHF in Indonesia

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Abstract:

Since 1970, the worldwide distribution, frequency and intensity of epidemics of dengue and dengue haemorrhagic fever (DHF) have increased dramatically. In Indonesia, as elsewhere, the geographic distribution and behaviour of the two main vectors - Aedes aegypti and Aedes albopictus - and the consequent transmission dynamics of the disease are strongly influenced by climate. Monthly incidence data were examined in relation to monthly data for temperature, rainfall, rainfall anomalies, humidity and the Southern Oscillation Index for 1992-2001. Focusing on eight provinces, significant Pearson correlations were observed between dengue/DHF incidence and at least one climate variable (r Euro Surveillance (Bulletin Europeen Sur Les Maladies Transmissibles; European Communicable Disease Bulletin) +/- 0.2 to +/- 0.43; P < 0.05). Multiple regression analyses showed that 12.9-24.5 per cent of variance in incidence was explained by two or three climate variables in each province (P < 0.1-0.01). Rainfall appears to be the principal climatic agent affecting the geographic distribution and temporal pattern of incidence while temperature appears to play a critical role in outbreak intensity. Wide regional and temporal variations in the strength and nature of the observed associations led to the identification of three groups of provinces where increases in dengue/DHF incidence were variously associated with increased rainfall, decreased rainfall and/or high susceptibility to climate variability. Although climatic factors play an important role in explaining the timing and intensity of dengue/DHF outbreaks, a wide range of other factors specific to local environments also appear to be involved - information that may assist in the prediction and mitigation of regional dengue/DHF outbreaks.

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Resource Description

Early Warning System: ☒

resource focus on systems used to warn populations of high temperatures, extreme weather, or other elements of climate change to prevent harm to health

A focus of content

Exposure : ☒

weather or climate related pathway by which climate change affects health

Ecosystem Changes, El Nino Southern Oscillation, Temperature

Temperature: Fluctuations

Geographic Feature:

resource focuses on specific type of geography

Tropical

Geographic Location:

resource focuses on specific location

Non-United States

Non-United States: Asia

Asian Region/Country: Other Asian Country

Other Asian Country: Indonesia

Health Impact:

specification of health effect or disease related to climate change exposure

Infectious Disease

Infectious Disease: Vectorborne Disease

Vectorborne Disease: Mosquito-borne Disease

Mosquito-borne Disease: Dengue

Mitigation/Adaptation:

mitigation or adaptation strategy is a focus of resource

Adaptation

Model/Methodology:

type of model used or methodology development is a focus of resource

Outcome Change Prediction

Resource Type:

format or standard characteristic of resource

Research Article

Timescale:

time period studied

Short-Term (

Vulnerability/Impact Assessment:

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content